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09/783,604	02/15/2001	Atsushi Shimoda	501.39619X00	9403

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EXAMINER

KIBLER, VIRGINIA M

ART UNIT	PAPER NUMBER
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2623

DATE MAILED: 12/02/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/783,604

Applicant(s)

SHIMODA ET AL.

Examiner

Virginia M Kibler

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on .
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☒ Claim(s) 16-22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 February 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to because Figures 2 and 8 are not in English. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Specification***

2. The disclosure is objected to because of the following informalities: “further” should be changed to “further” in para. 0005, line 4; “defect defects” should be changed to “defect” in para. 0029, line 14; “such s” should be changed to “such as” in para. 0041, line 3; “A 1221” should be changed to “A 121” in para. 0045, line 4; “smflar” should be changed to “similar” in para. 0073, line 2; “defcdt” should be changed to “defect” in para. 0075, line 4; “hght” should be changed to “light” in para. 0080, line 5; “perfonnedin” should be changed to “performed in” in para. 0093, line 1; “, The” should be changed to “, the” in para. 0094, line 3; “fawt” should be changed to “fault” in para. 0094, line 12; “Here. ” should be changed to “Here, ” in para. 0104, line 7; “sinee” should be changed to “since” in para. 0104, line 8; “identffy” should be changed to “identify” in para. 0106, line 3; “minimims” should be changed to “minimal” in para. 0106, line 5; “onutted” should be changed to “omitted” in para. 0112, line 2; “maimer” should be changed to “manner” in para. 0115, line 3; “sliiping” should be changed to “shipping” in para. 0116, line 7, and para. 0118 (same as para. 0117) should be deleted.

Appropriate correction is required.

***Information Disclosure Statement***

3. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

***Claim Objections***

4. Claims 16-22 are objected to because of the following informalities:

In claim 16 "of said;" should be changed to "of said defects;" in line 6; "a electrical" should be changed to "an electrical" in line 8; "comparater" should be changed to "comparator" in line 9; and "output" should be changed to "outputs" in line 13. Claims 17-22 are dependent upon claim 16, and are thereby objected to.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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6. Claims 2, 4, and 12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 recites the limitation "said displayed detailed information" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim 4 recites the limitation "said classified detailed information" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitation "said detected defect images" in line 2. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 5, and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsuo (JP 11-176899).

Regarding claim 1, Matsuo discloses a method for analyzing defects in electronic circuit patterns comprising a step for detecting a defect in an inspected object (Para. 0008) and storing position information for the detected defect (Para. 0008; Para. 0014), a step for collecting detailed information of the defect for which the position information is stored and storing the

collected detailed information in association with the defect position information (Para. 0012), a step for electronically testing the inspected object (Para. 0015) and storing position information for a position at which a fault is generated in the electronic test (Para. 0016; Para. 35-36), a step for comparing the stored defect position information and the fault generating position information (Para. 0019), and a step for classifying the detected defect based on results from the comparing step (Para. 0020-0021). Matsuo further discloses displaying a warning when a defect exceeds a criterion (Para. 0021), thereby displaying information relating to the classified defect.

Regarding claim 5, Matsuo discloses a method for analyzing defects in electronic circuit patterns comprising a step for inspecting a first inspected object during a production process (Para. 0006; Para. 0008) and storing information relating to a defect detected by the inspection including position information of the detected defect (Para. 0008; Para. 0014), a step for performing an electronic test on the first inspected object after the production process is completed to detect faults in the first inspected object (Para. 0015; Para. 0023; Drawing 2) and storing fault generation position information (Para. 0016; Para. 35-36), a step for comparing the position information of the defect detected in the inspection of the first inspected object during the production process with the electronic test fault generating position detected by the electronic test performed on the first inspected object after the production process is completed (Para. 0019), a step for classifying the detected defect during the production process based on the comparison result (Para. 0020-0021), and a step for outputting information on the classified defect (Para. 0021).

Regarding claim 8, Matsuo discloses outputting information relating to a fault generation rate for each classification of the classified defects (Para. 0020; Para. 0035).

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 2, 3, 4, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuo (JP 11-176899) as applied to claims 1 and 5 above, and further in view of Eskridge et al. (6,597,381).

Regarding claim 2, Matsuo does not appear to recognize selecting a representative sample from the displayed information. However, Eskridge et al. ("Eskridge") teaches that it is known to analyze defects by displaying images of the defects (Col. 6, lines 15-29) and selecting a representative sample from the detailed information (Col. 6, lines 49-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the information displayed by Matsuo to include displaying the image of the defect and selecting a representative sample as taught by Eskridge because it provides the user with the ability to correct the classification and thereby increase system reliability.

Regarding claim 3, Matsuo does not appear to recognize calculating characteristic values from selected representative samples. However, Eskridge teaches that it is known to calculate characteristic values from the selected representative samples and determine guidelines for

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classifying the detailed information based on the calculated characteristic value (Col. 7, lines 58-67, Col. 8, lines 1-22). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the classification disclosed by Matsuo to include calculating characteristic values from representative samples and determining guidelines for classifying as taught by Eskridge because it provides the user the ability to interact and modify the classification of defects to improve the detection system accuracy.

Regarding claim 4, the arguments analogous to those presented above for claims 2 and 3 are applicable to claim 4.

Regarding claim 12, Matsuo does not appear to recognize displaying detected defect images. However, Eskridge teaches that it is known to display detected defect images by classification (Col. 8, lines 23-28). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the display disclosed by Matsuo to include displaying images of the detected defects by classification as taught by Eskridge because it provides the user a visualization of the classification and enables the user to quickly detect misclassifications.

11. Claims 6, 7, 16, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuo (JP 11-176899) as applied to claim 5 above, and further in view of Ishikawa et al. (5,841,893).

Regarding claim 6, Matsuo does not appear to recognize classifying the detected defects as critical or non-critical. However, Ishikawa et al. ("Ishikawa") teaches that it is known to determine the criticality of defects, thereby classifying as either critical or non-critical (Col. 14, lines 6-12). Therefore, it would have been obvious to one of ordinary skill in the art at the time



of the invention to have modified the classification of defects disclosed by Matsuo to include classifying as critical or non-critical as taught by Ishikawa because it is the fundamental categorization for classifying the defects.

Regarding claim 7, the arguments analogous to those presented above for claim 6 are applicable to claim 7. Ishikawa discloses classifying the defects into numerous categories (Col. 21, lines 35-39), thereby classifying the non-critical defects into at least two categories.

Regarding claim 16, the arguments analogous to those presented above for claim 5 are applicable to claim 16. Matsuo does not appear to recognize using different memories. However, Ishikawa teaches that it is known to use separate memories to store position information of defects (Figure 36, 1206), detailed information of the defects (Figure 37, 1118), and position information of electrical defects (Figure 46, 1161). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the storage disclosed by Matsuo to include separate memories as taught by Ishikawa because it is a matter of design choice and it will reduce data acquisition time.

Regarding claims 18 and 19, the arguments analogous to those presented above for claims 6 and 7 are applicable to claims 18 and 19, respectively.

Regarding claim 20, the arguments analogous to those presented above for claim 8 are applicable to claim 20.

12. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuo (JP 11-176899) as applied to claim 5 above, and further in view of Zika et al. (6,496,596).

Regarding claims 9-11, Matsuo discloses inspecting a second inspected object during production process, obtaining information relating to a defect detected in inspection including

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position information of the defect, but does not appear to recognize predicting a critical defect volume. However, Zika et al. ("Zika") teaches that it is known to analyze the position information of the defect and predict a critical defect volume for the inspected object (Col. 2, lines 45-67; Figure 1). Zika further teaches that it can be repeated after any of the steps in the manufacturing process (Col. 1, lines 59-63). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the inspection disclosed by Matsuo to include predicting a critical defect volume as taught by Zika because it will provide adequate information to stop manufacturing in case of high defect volumes.

13. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuo (JP 11-176899) and Ishikawa et al. (5,841,893) as applied to claim 16 above, and further in view of Zika et al. (6,496,596).

Regarding claims 21 and 22, Matsuo and Ishikawa disclose inspecting a second inspected object during production process, obtaining information relating to a defect detected in inspection including position information of the defect, but do not appear to recognize predicting a critical defect volume. However, Zika et al. ("Zika") teaches that it is known to analyze the position information of the defect and predict a critical defect volume for the inspected object (Col. 2, lines 45-67; Figure 1). Zika further teaches that it can be repeated after any of the steps in the manufacturing process (Col. 1, lines 59-63). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the inspection disclosed by Matsuo and Ishikawa to include predicting a critical defect volume as taught by Zika because it will provide adequate information to stop manufacturing in case of high defect volumes.

14. Claims 13, 14, 17, and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuo (JP 11-176899) and further in view of Ishikawa et al. (5,841,893) and Eskridge et al. (6,597,381).

Regarding claim 13, the arguments analogous to those presented above for claims 5 and 6 are applicable to claim 13. Matsuo and Ishikawa do not appear to recognize displaying the defects on a screen and further modifying the classifications of the displayed defects. However, Eskridge teaches that it is known to display the classified detected defect images and modify the classifications (Col. 13, lines 4-13). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the display and classification disclosed by Matsuo and Ishikawa to include modifying the classification of displayed defect images as taught by Eskridge because it provides the user with a visual representation of the classification.

Regarding claim 14, Matsuo discloses outputting the results of comparison between the detected defect position information and the electronic testing fault generating positions (Para. 0018).

Regarding claim 17, the arguments analogous to those presented above for claim 4 are applicable to claim 17.

Regarding claim 23, the arguments analogous to those presented above for claim 16 are applicable to claim 23. Matsuo and Ishikawa do not appear to recognize storing images of the defects. However, Eskridge teaches that it is known to classify the stored defect images (Col. 13, lines 4-13). ). Therefore, it would have been obvious to one of ordinary skill in the art at the

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time of the invention to have modified the display and classification of defects disclosed by Matsuo and Ishikawa to include modifying the classification of displayed defect images as taught by Eskridge because it provides the user with a visual representation of the classification.

Regarding claims 24-26, the arguments analogous to those presented above for claims 18-20 are applicable to claims 24-26, respectively.

15. Claims 15, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuo (JP 11-176899), Ishikawa et al. (5,841,893), and Eskridge et al. (6,597,381) as applied to claims 13 and 23 above, and further in view of Zika et al. (6,496,596).

Regarding claim 15, the arguments analogous to those presented above for claim 13 are applicable to claim 15. Matsuo, Ishikawa, and Eskridge disclose inspecting a second inspected object during production process and detected defects are classified using information relating to modified defect classifications, but do not appear to recognize predicting a critical defect volume. However, Zika teaches that it is known to analyze the position information of the defect and predict a critical defect volume for the inspected object (Col. 2, lines 45-67; Figure 1). Zika further teaches that it can be repeated after any of the steps in the manufacturing process (Col. 1, lines 59-63). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the inspection disclosed by Matsuo, Ishikawa, and Eskridge to include predicting a critical defect volume as taught by Zika because it will provide adequate information to stop manufacturing in case of high defect volumes.

Regarding claims 27 and 28, the arguments analogous to those presented above for claims 21 and 22 are applicable to claims 27 and 28, respectively.

***Other Prior Art Cited***

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

JP 08-021803 to Kozu for defect type judging device and process control system;

U.S. Pat. No. 5,801,965 to Takagi et al. for manufacturing semiconductor devices and inspecting semiconductor devices;

U.S. Pat. No. 5,966,459 to Chen et al. for ADC reclassification engine;

U.S. Pat. No. 5,761,337 to Nishimura et al. for inspection of the appearance of bumps;  
and

U.S. Pat. No. 6,535,776 to Tobin, Jr. et al. for localizing and isolating errant process steps.

***Contact Information***

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Virginia M Kibler whose telephone number is (703) 306-4072. The examiner can normally be reached on Mon-Thurs 8:00 - 5:30 and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.



VK

11/25/03

**MEHRDAD DASTOURI**  
**PRIMARY EXAMINER**

